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THE DEPARTMENT OF DEFENSE STATEMENT ON THE DEFENSE ENERGY TECHNOLOGY PROGRAM

by

RUTH M. DAVIS

DEPUTY UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ADVANCED TECHNOLOGY

BEFORE THE

RESEARCH AND DEVELOPMENT SUBCOMMITTEE

OF THE

COMMITTEE ON ARMED SERVICES

OF THE

UNITED STATES HOUSE OF REPRESENTATIVES

96th CONGRESS, FIRST SESSION

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Mr. Chairman and Members of the Committee:

It is my priviledge to have this opportunity to testify in support of the Department of Defense Energy Technology Program. I am accompanied by Dr. George Gamota of my staff and by Lieutenant Commander Larry Lukens, who is assisting me on energy technology. This is the first time I have had the pleasure of reporting to this Committee on our Energy Technology Program and I welcome the opportunity to discuss the crucial nature of the defense energy problem. It provides a real impetus to this explanation of the goals and objectives we have established, the policies we are implementing, our accomplishments to date, and the future thrust we deem necessary. The assignment of responsibility for the DOD Energy Technology Program to my office is new this year. We have nonetheless, already taken positive actions to establish an effective energy management organization and to develop a sound energy technology foundation - actions which we consider to be of signal importance to our ability to improve the efficiency of energy use and to guarantee assured supplies of energy for the Armed Forces.

I. THE ENERGY PROBLEM FROM A DEFENSE PERSPECTIVE

A. RELIANCES ON MOBILITY FUELS

Our national security objectives can be achieved only if we are thoroughly prepared to meet essential military energy requirements. The continuation of our ability to deter armed conflict, to produce modern weapon systems, to maintain the

readiness of our military forces, and to support worldwide commitments on the seas, in the air, and on the ground, depends on energy, particularly liquid hydrocarbon fuels.

Accordingly, guaranteed access to assured supplies of energy, particularly mobility fuels, must be considered an essential ingredient in ensuring our national defense. This is true whether we are at peace, in a time of crisis, or at war. Our capability for meeting this goal is becoming increasingly difficult as our energy supplies become more costly and much less subject to our control.

I would emphasize that our military capabilities in any given part of the world are strongly dependent on the mobility of our weapons and support system. As a result, we are becoming increasingly concerned about our heavy reliance upon liquid hydrocarbon fuels now and in the foreseeable future. In fiscal year 1978, the DOD energy usage totaled 247 million barrels of oil equivalent or about 2 percent of the Nation's total energy usage. Defense related industries used an additional 2-3 percent of the national total. These percentage usage totals represent recent peacetime consumption patterns. We estimate that DOD's energy usage would increase about threefold in a typical wartime scenario. In terms of energy sources, nearly 70 percent of DOD's total energy requirement is for petroleum products. This compares to approximately 46 percent for the United States as a whole.

Approximately 90 percent of DOD's total petroleum consumption, or 413,000 barrels per day, is for mobility fuels for use in air-

craft, shipboard and land-based mobile systems. Unlike the civilian sector, in which approximately 70 percent of the petroleum consumption is in gasoline and heating oil products, DOD is considerably more dependent upon the middle distillate fuels: nearly 80 percent of these middle distillate liquid petroleum supplies are consumed by aircraft and shipboard systems. While DOD's pro rata share of the Nation's total energy usage is comparatively small, the DOD is in fact the single largest energy user in the United States and accounts for 81 percent of the total energy usage by the Federal Government.

Looking to the foreseeable future, we see little or no relief in this pattern of heavy DOD dependence upon liquid hydrocarbon fuels. Indeed, our current projections indicate little if any change in our future requirements for these fuels. As is the case in the civilian transportation industry, the DOD continues to design and build weapon systems under the implicit assumption that they can be fueled with petroleum-like products. Accordingly, the majority of our planned weapons system vehicles as well as the majority of those currently in operation, which together constitute the mainstay of our military capability until the turn of the century or later, are dependent upon liquid hydrocarbon fuels. My point is simply this: unless our present designs, as well as many of our currently operating weapons systems, are modified extensively, liquid hydrocarbons will continue to be the primary mobility fuel for the DOD well into the 21st century.

As evidenced by the fact that current U. S. crude oil imports are up 152 percent over 1973 levels, our most serious near term energy problem is our growing reliance upon foreign oil to compensate for the inability of domestic production to keep pace with domestic demand. Considering the practical reality of DOD's continued dependence upon liquid hydrocarbon fuels, this pattern of ever increasing dependence upon foreign oil poses a most serious threat to our ability to guarantee adequate energy supplies to meet essential military requirements, particularly for mobility fuels.

B. DOD'S VULNERABILITY TO ENERGY SUPPLY INTERRUPTIONS

In defense terms, our ability to provide assured supplies of energy necessarily requires a supply system that is, to the maximum extent possible, invulnerable to interruption in both war and peacetime. The 1973-74 oil embargo provided a first dramatic, albeit brief, example of our vulnerability to foreign petroleum supplies. More recent events, particularly the political crisis in Iran, should once again serve as a constant reminder of the explicit military vulnerability we evince with each additional barrel of foreign oil imported to the U. S. These events provide renewed awareness of our increasing susceptability to the potential for political, economic, or military pressure - pressure applied by those who either have the ability to control directly or can indirectly influence the flow of oil to the U. S. and to its allies.

Given the continuing risk of politically motivated energy supply interruptions, the potential also exists for considerably more serious interruptions of oil supplies in time of war. During periods of open confrontation, hostile forces could well succeed in restricting our access to essential oil supplies to an extent far more severe, in both quantity and duration, than that posed by political embargos. Whether through attempts to deny access to Persian Gulf oil and oil loading ports, or through attempts to interdict tanker movements on the high seas, any one or combination of these actions could seriously affect the ability of the U. S. and its allies to adequately protect their individual or collective national security.

The political and economic risks of foreign oil supply interruptions are very serious and very real to our national security - no less so are the military risks.

In wartime, the essential nature of assured supplies of mobility fuels is obvious. I assume, however, that in wartime, military fuel requirements would have top priority and could be satisfied by a combination of domestic production, conservation, reallocation, and use of strategic reserves.

I would point out though that assured supplies of military mobility fuels during peacetime should not be considered any less crucial to our military security. The military balance

between the United States and its adversaries depends critically on the readiness of our Armed Forces as well as our real or perceived ability to employ these forces when it is in our vital interest to do so. The maintenance of acceptable levels of force readiness combined with our ability to employ these forces is, in turn, inextricably related to energy. The continued dependence of our forces on liquid hydrocarbon fuels, when combined with the Nation's growing dependence on vulnerable sources of foreign oil supplies, now approaching 50 percent of total U. S. requirements, gives cause for grave concern about our ability to adequately provide for our national security.

We must find energy alternatives - alternatives that are domestically controllable, technically feasible, and economically, environmentally, and socially acceptable, - alternatives that are insensitive to foreign supply interruptions - alternatives that are insensitive to capricious economic and geopolitical actions.

C. INCREASING ENERGY COSTS

In addition to our concerns about guaranteed access to assured energy supplies, the budgetary impact of increased energy costs has already caused DOD to incur a lower margin of readiness than we might otherwise prefer. The total DOD costs for energy in fiscal year 1978 exceeded $4 billion - more than double our energy costs in fiscal year 1973. This increase in our energy budget has been accompanied by a 30

percent reduction in DOD energy usage over the same time frame. As evidenced by more recent escalations in the price of foreign oil, we do not anticipate any significant relief from this pattern of increasing energy costs. For this reason alone, it is essential for all elements of the DOD to use energy in the most efficient manner possible.

In addition to the budgetary motivation for more efficient energy use, the DOD is obligated by law and by executive order to support the federal energy management program as it applies to federal agencies and to the nation. By virtue of DOD's predominance as the largest energy user within the federal government, we must, and will, take a lead role in reducing our use of energy.

The combination of these factors - the increasing vulnerability of energy supplies and the budgetary impact of increasing energy costs - stresses the need for a continuing military requirement to develop an efficient military energy system that is, to the maximum extent possible, invulnerable to foreign energy supply interruptions. This philosophy represents the cornerstone of DOD's Energy Technology Program.

II. THE DOD ENERGY PROGRAM

The Energy Technology Program is being conducted within the context of a broader DOD energy program. In this regard, the DOD has established a set of general energy objectives

combined with specific energy goals. The general objectives are intended to ensure that DOD energy policies and programs are directed toward meeting the overall energy related needs of the DOD, while the specific energy goals provide a means for measuring progress toward the attainment of the objectives.

In support of DOD's primary aim to maintain the operational readiness of our strategic and tactical forces at a level sufficient to ensure the national security regardless of energy supply conditions, DOD has established the following general energy objectives:

- To broaden the range of mobility fuels which can be used in military systems, with primary emphasis on domestically produced synthetic fuels;
- To promote energy conservation, with primary emphasis on the development of more energy efficient propulsion and power generation equipment; and
- To reduce the dependence of military installations, particularly remote bases, on petroleum derived fuels, by promoting the use of more abundant or renewable energy sources where liquid hydrocarbon fuels and natural gas are now used.

In support of these general energy objectives, DOD has established the following specific energy goals:

- In the area of mobility fuels,
  - To devise with DOE, a national strategy to minimize

the disruption of liquid hydrocarbon fuels supplies to DOD;

- To develop propulsion systems and adequate specification and testing procedures to accomodate the use of a broader range of fuels; and
- To prepare now to transition from the use of petroleum based to synthetic fuels in the post 1985 time frame.

- In the area of energy conservation,
  - To comply with the energy reduction goals for 1985 as set forth in Executive Order 12003 to reduce energy usage in existing and new buildings by 20 percent and 45 percent, respectively, and to exceed the statutory requirements for fuel economy in the DOD passenger auto fleet; and
  - In mobility operations, to limit the level of energy usage in 1985 to that used in 1975 through improvements in propulsion systems, increased efficiency of mobile equipment use in operations and training, and through increased use of simulators in training.
- In the area of improved energy self-sufficiency for military installations,
  - To obtain a 10 percent use of more abundant and renewable solid fuels by 1985;
  - To obtain a one percent use of solar and geothermal energy by 1985;

- To equip all natural gas only heating plants over 5 MBtu/Hour with alternative fuel capability by 1982; and
- To have on-hand a 30-day fuel oil supply for all heating units greater than 5MBtu/hour.

III. THE DOD ENERGY TECHNOLOGY PROGRAM

The prime objective of the Energy Technology Program is to provide the technological inputs required to meet the objectives and goals of the overall DOD energy program, as described above. Accordingly, the major thrusts of the program are directed toward the application and, when necessary, the development of specific technologies that will enable DOD:

- To encourage, in cooperation with DOE, the commercialization of a domestic synthetic fuels industry, capable of producing mobility fuels for military use, and to utilize domestically produced synthetic fuels in military mobile systems;
- To reduce overall energy consumption through efficiency improvements without compromising flexibility, readiness, or performance; and
- To achieve an adequate degree of energy self-sufficiency for military installations through reduced dependence on petroleum fuels.

In the execution of the DOD Energy Technology Program, every effort is being made to adhere to the following guidelines:

- To identify and to encourage and support, in cooperation

with DOE, commercialization technologies required to develop assured liquid hydrocarbon fuel sources, with primary emphasis on synthetic fuels for military mobile systems;

- To develop and maintain our status as an informed customer for new energy technologies being developed with government support, or by industry;
- To apply energy technologies developed by others to hardware and systems that are unique to military mission requirements;
- To build an energy technology base only in areas essential to the military mission where the technology is not being developed elsewhere;
- To pursue only those energy technologies that have clear applicability to military systems;
- To fully coordinate all projects within DOD and with the national program. Projects must not be duplicative of other government/industry efforts; and
- To pursue only those projects that show a high probability of offering a positive monetary payback or of providing a new military capability commensurate with cost.

IV. DOD ENERGY MANAGEMENT

The DOD has established a defense energy management organization to provide policy, programmatic, and budgetary guidance for, and to effect coordination of, the overall military energy program in the areas of conservation, supply, and research and development.

The Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics (ASD(MRA&L)) is the principal DOD energy conservation officer. His deputy, the Deputy Assistant Secretary of Defense for Energy, Environment and Safety (DASD(EES)), is responsible for energy policy and is the focal point for all DOD energy matters. The Director for Energy Policy, under the DASD(EES), has responsibility for policy formulation in matters of energy conservation, management, supply, and technology applications.

The Defense Energy Policy Council (DEPC) provides the DASD(EES) with the means to coordinate energy policy at the highest level as well as to contribute valuable feedback on energy programs and problems. The membership of the DEPC is comprised of senior staff elements in the Office of the Secretary of Defense, the energy focal points of the military departments, organization of the Joint Chiefs of Staff, and the Defense Logistics Agency. A lower level group, the Defense Energy Action Group (DEAG), enables the Director for Energy Policy to develop energy policy.

In addition to the DASD(EES), there are two other Office of the Secretary of Defense elements involved with energy policy and programs through their respective program management responsibilities:

- The Deputy Assistant Secretary of Defense for Installations and Housing (DASD(I&H)), also deputy to the ASD(MRA&L), provides overall project management of the military construction program.

o The Office of the Under Secretary of Defense for Research and Engineering (OUSDR&E) has management responsibility for the Energy Technology Program.

In addition, each military department has a special assistant for energy matters as well as an energy office to operate departmental energy programs and to take lead action, when assigned, in designated areas of interest to all military departments.

V. DOD ENERGY TECHNOLOGY PROGRAM ACCOMPLISHMENTS

Within OUSDR&E, our primary efforts to date have focused on a series of actions which are intended to provide the basic framework upon which DOD can formulate a comprehensive, fully coordinated defense mobility fuels strategy. These actions were initiated in December 1977, when, at the direction of the Deputy Secretary of Defense, a Task Force was established, chaired by myself, to address and to make recommendations on the alternatives available to DOD to meet its future mobility fuel requirements. The Task Force issued its final report in October 1978 with the following major recommendations:

o That a comprehensive Defense Mobility Fuels Action Plan be developed, the essential ingredients of which should place strong emphasis in the following areas:

- Cooperative efforts between DOD and DOE to assist in meeting DOD's mobility fuel requirements through the commercial development of a domestic synthetic fuels industry, with early emphasis on military and commercial fuels derived from oil shale;

- The formulation of technical and operational plans required for DOD to accommodate a transition from the use of conventional to synthetic fuels in the post 1985 time frame;
- An accelerated DOD engine/fuel technology program to establish acceptable synthetic fuels specifications and to develop engine systems capable of burning a broad range of synthetic and conventional fuels; and
- The development of the industrial base required to enable DOD to implement the capability to use synthetic fuels.

o That a series of management and organizational actions be taken to ensure complete vertical and horizontal coordination within DOD and with other agencies of the Federal Government.

These Task Force recommendations were subsequently approved by the Deputy Secretary of Defense in November 1978, at which time directives were issued to various organizational elements within DOD to undertake those actions necessary to fully develop the plan. In this regard, we are currently formulating specific program requirements in conjunction with attempting to establish the required interagency and industry infrastructures.

In undertaking this important effort, we fully recognize that the successful transition from conventional to synthetic fuels, or combinations thereof, will require two distinct but closely related actions. First, we must expand our ongoing

efforts to fully develop the capability to use synthetic fuels in mobile military systems, and to do so without sacrificing mission requirements. The DOD must assume primary responsibility for developing this capability - a capability which will make us a ready, willing, and able customer for synthetic mobility fuels at the time they become available in commercial quantities.

The second action is intended to lead to the availability of commercial quantities of domestically produced synthetic fuels. We fully recognize DOE's responsibility here: at the same time, we believe DOD, serving as a major customer for synthetic fuel products, can provide an important impetus for achieving this goal.

The implementation of the Defense Mobility Fuels Action Plan mentioned earlier is dependent on the successful and timely development of both the production and utilization components of an overall synthetic fuel technology. Within the U. S., no such technology has been demonstrated on a scale commensurate with commercialization requirements. The continuing absence of a commercial capability to produce synthetic mobility fuels will negate any success achieved by DOD in developing the capability to use synthetic mobility fuels, and vice versa. For this reason, comprehensive and well coordinated plans must be developed jointly by DOD and DOE: we are attempting to do this now.

Considering the most crucial nature of the defense energy problem as it relates to our heavy dependence upon liquid

hydrocarbon fuels. I have necessarily placed early emphasis within the energy technology program on the development of the Defense Mobility Fuels Action Plan. In parallel with continuing efforts to fully implement the Mobility Fuels Action Plan, we have shown significant progress in the areas of synthetic mobility fuels, energy self-sufficiency for military installations, and in energy conservation. For example:

o In 1974, the Navy served as the lead agency for a joint DOD, NASA, Coast Guard, Maritime Administration (MARAD), and Energy Research and Development Administration (ERDA) project to refine and test fuels derived from 10,000 barrels of crude shale oil. The fuel types produced were gasoline, JP-4, JP-5/Jet A, DFM/DF-2, and heavy fuel oil. These fuels were tested at various government and industry laboratories.

This 10,000 barrel shale oil project culminated in the successful operational flight of a T-39 jet aircraft by the Air Force; the successful operational cruise of the Great Lakes steamer, Edward B. Green, sponsored by the Navy, MARAD, and the Coast Guard; and the operational testing of a jeep (L-141) engine by the Army. These tests clearly demonstrated the feasibility of using crude shale oil as a feedstock for military fuels, particularly those in the middle distillate range (jet and diesel fuels).

As a follow-on to the 10,000 barrel shale oil refining and testing project, the Navy is serving as the contracting agency and project director for a joint DOD-DOE-NASA program, which began in 1976, to acquire, refine, and test fuels derived from shale oil produced by the Paraho process on the Naval Oil Shale Reserves near Rifle, Colorado. From January 1977 through September 1978, 88,225 barrels of crude shale oil were produced under Navy and DOE contracts in support of this program. Between October 1978 and February 1979, the shale crude was refined into military specification fuels for testing by the military services and other agencies.

o The Department of Defense and the Department of Energy have completed preliminary planning on a series of major demonstration initiatives. The two departments have identified projects on solar, photovoltaics, geothermal electric, geothermal space heating, wood-fueled central power plants, and, finally, three installations to become "showcases" of energy technology. When fully implemented, these joint projects will provide a basis from which we can reduce our use of petroleum and natural gas and, thereby, attain a level of energy self-sufficiency for DOD facilities less sensitive to petroleum shortages.

o The accumulation of fouling of ship's hulls and appendages has been identified as the single largest shipboard fuel

consumption penalty, resulting in loses of as much as one third in propulsion efficiency. In FY 1978, this penalty was estimated at approximately 3.8 million barrels of fuel, representing some $68 million in direct fuel costs. Through R&D work sponsored by the Navy, it has been demonstrated that approximately half of this penalty can be recouped using underwater hull cleaning techniques. Most sea trails have been completed and candidate hull cleaning systems have been evaluated. Interim cleaning instructions have been issued to fleet units and contractual provision for the fleetwide program is provided for, starting in FY 1979.

o Improved antifouling hull coatings are being developed as a sequel to the hull cleaning project to achieve the full benefits of a fouling-free hull (an estimated annual ship fuel consumption reduction of 16 percent). Reduced drydock time, increased speed and endurance, and significantly reduced fuel costs are expected to result from such coatings, which are based on organometallic polymers (OMP). Screening of initial OMP paint formulations has been completed and two candidates have been selected for ship trials on a West Coast ship. One ship hull in the Pacific has been painted with test stripes.

o Air Force sponsored R&D, now in the advanced development stage, shows promise of a 10-15 percent reduction in specific fuel consumption for fighter aircraft and up to a 30 percent reduction for trainer aircraft through engine efficiency improvements.

o In other Air Force sponsored research, the KC-135 winglet program is anticipated to result in a 15 percent reduction in drag and a 5 percent improvement in overall aerodynamic efficiency, which will result in a 37.6 million-gallon annual fuel savings.

o Under a program aimed at future diesel engine applications for medium weight combat vehicles, the Army has completed an extensive analysis and design study which shows the potential for a 10 percent reduction in fuel consumption through recovery of excess exhaust gas energy via turbocompounding. Detailed design and fabrication of an engine for testing has been initiated.

A continuation of the program initiatives such as those cited above, along with an expanded effort in synthetic mobility fuels, will provide a well-balanced Energy Technology Program - a program that is fully responsive to our military energy technology needs.

VI. FUTURE THRUSTS

The Energy Technology Program will continue to provide the necessary management and technical inputs required to support the goals of the overall DOD energy program - goals which must be met if we are to ensure that our military commitments are not to be compromised by energy dislocations and increased energy costs. In management terms, we have been successful in establishing an organization that will continue to facilitate effective interactions between the military services, with other agencies,

and with industry in order to avoid redundancies and gaps in the planning and execution of the Energy Technology Program.

In terms of policy formulation and program planning, the main focus will continue to be on mobility fuels, with primary emphasis directed toward placing the DOD in the position of an informed customer for the fuels produced by the emerging domestically controllable synthetic fuels industry, and to encourage, in any way possible, attempts to accelerate the development of this most critically needed indsutry. In this regard, we anticipate signing a Memorandum of Understanding on Synthetic Mobility Fuels with the Department of Energy in the near future. This MOU will provide for the conduct of cooperative activities between DOD and DOE to identify and to develop assured liquid hydrocarbon fuel sources. The initial emphasis of this joint program will be two fold. First, efforts will be directed toward the development of a commercial shale oil industry capable of producing refined products that meet the mobility fuel specifications established by DOD. Secondly, we will accelerate the DOD engine/ fuel technology program to establish acceptable synthetic fuel specifications and to develop engine systems capable of burning a broad range of synthetic and conventional fuels.

These combined actions - improved flexibility in our use of conventional fuels in the short term and the transition from the use of conventional to synthetic fuels in the longer term - are critical to our ability to provide guaranteed access

to assured supplies of defense mobility fuels.

In the area of energy self-sufficiency for military installations, the Energy Technology Program will continue to provide technological support for the application of energy systems and the development of energy resources indigenous to DOD facilities. In this regard, our primary emphasis will be directed toward continued support of the on-going and planned joint DOD/DOE demonstration activities referenced earlier. DOD support as a test-bed for these DOE demonstration programs provides a unique opportunity to accelerate the adoption of various DOE and industry sponsored energy technologies to land-based military applications with minimum DOD effort.

With regard to energy conservation, I mentioned earlier that DOD has realized a 30 percent reduction in energy usage over the 1973-1978 time frame. While these savings are certainly noteworthy it must be emphasized that they were accomplished primarily through a combination of force level reductions and reduced operating tempos. Any further energy savings through reductions of this nature will have a serious impact upon our ability to maintain acceptable levels of force readiness. It is essential therefore, that further energy savings must come from improvements in the efficiency of energy use.

Accordingly, the future thrusts of the Energy Technology Program as it relates to conservation, will seek to accelerate the application and, when necessary, the development of specific

technologies that will effect efficiency improvements in our present and future military systems.

In summary, the future thrusts of the Energy Technology Program will continue to key on the management and technical inputs required to support the goals of the overall DOD energy program. In this regard, it is important, I believe, that we expand our efforts in synthetic mobility fuels, accelerate the advanced and engineering development of our more promising energy conservation concepts, and maintain the established momentum of our energy self-sufficiency programs. I will be asking for your support to do so in the coming year.

VII. FISCAL YEAR 1980 ENERGY TECHNOLOGY FUNDING PROFILE

In presenting the FY 1980 DOD Energy Technology Budget, I must emphasize that the amount of funds included under the category of "Energy Research" is primarily a function of how the individual Services have chosen to define, to manage, and to fund their respective energy technology programs. As evidenced by the budget listings provided below, the Navy, in comparison to the Army and the Air Force, has chosen to apportion a much higher percentage of their energy research programs to specific energy program element categories.

A case in point is the Navy program to reduce the fuel consumption of Navy ships through the periodic removal of biofouling from underwater hull surfaces, and the Air Force program to reduce aircraft drag through the use of winglets and by modifying the wing leading edge. While these two

programs are, in fact, quite similar in terms of their energy conservation objectives, the Navy program is being funded under the category of Energy Research, whereas the Air Force program is being funded under the category of Aerospace Flight Dynamics.

While it appears, therefore, that there exists a significant difference between the Service levels of effort being devoted to energy research, the Service programs are, in fact, in parity, with each being funded approximately at the level indicated below for the Navy program.

Given the framework of the conditions discussed above, the FY 1980 DOD budget for energy technology by Service is as follows:

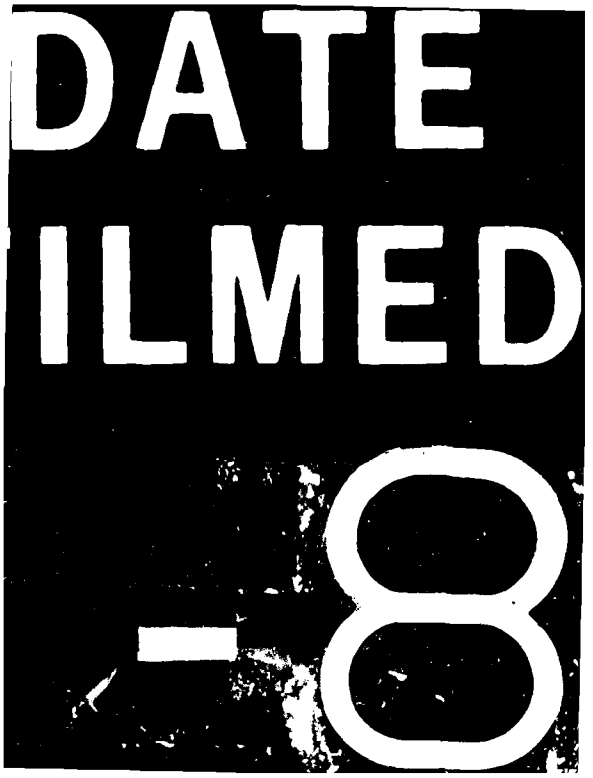
Service	Program Element No.	Title	FY 80 ($000)
Army	PE 62781A	Military Energy Technology	2,600
	PE 62733A	Mobility Equipment Technology	200
		Army Total	2,800
Navy	PE 62765N	Energy Technology	6,060
	PE 63724N	Navy Energy Program/ Advanced	17,180
	PE 64710N	Navy Energy Program/ Engineering	9,015
	PE 65861N	Energy R&D Support	1,274
		Navy Total	33,529
Air Force	PE 62203F	Aerospace Propulsion	1,400
	PE 63215F	Aviation Turbine Fuels	2,800
	PE 63723F	Civil/Environmental Technology	200
	PE 64708F	Other Operational Equipment	750
		Air Force Total	5,150

I am now in the process of making more uniform each of the Service energy technology programs in order to provide programmatic and budgetary consistency in reporting. The results of this coordination effort will be reflected starting in fiscal year 1981.

VIII. CONCLUDING COMMENTS

The seemingly inevitable disruption of energy sources not under U. S. control, and the budgetary impact of increasing energy costs, poses a serious threat to our ability to maintain the operational readiness of our Armed Forces at a level sufficient to ensure the national security. Accordingly, the development of an efficient military system - one that is invulnerable to foreign energy supply interruptions - is essential if we are to maintain acceptable levels of force readiness while adhering to a strong conservation ethic and a shift to domestically controllable energy sources.

If we do our job right, we will contribute towards ensuring that our energy supply lines remain full, providing energy to support our military force - energy that is in the right form, in the right place, and in sufficient quantities to maintain our national security.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